

KIRSTENBOSCH GARDENING SERIES



GROW LIMJAS

Graham D Duncan

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Technical editor: Deirdré Snijman

General editor: Caroline Voget

Design: David Davidson, Valerie Phipps-Smith

Gardening series co-ordinator: Neville Brown

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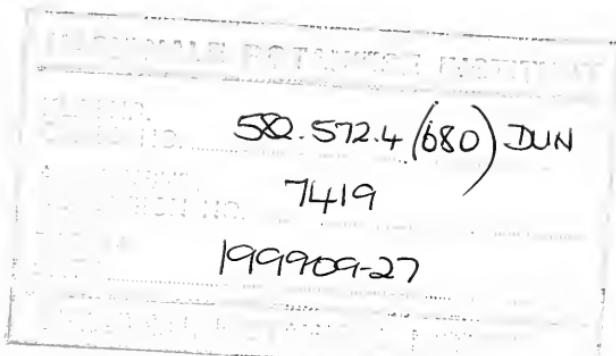
Kirstenbosch Gardening Series

GROW
CLIVIAS



**A GUIDE TO THE SPECIES, CULTIVATION AND
PROPAGATION OF THE GENUS CLIVIA**

Text and photographs by Graham D Duncan



Below: *Clivia miniata* flowering in habitat, Zululand, KwaZulu-Natal

Right: Ripe *Clivia gardenii* berries





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Clivia miniata (red form) from the Eastern Cape

Opposite: Hand-coloured lithograph of *Clivia miniata* by James Andrews (c. 1801- 1876), a prolific botanical artist from London, who contributed many plates to the *Floral Magazine*

Above right: *Clivia nobilis* (pinkish-yellow form) from the Eastern Cape



A BRIEF HISTORY

The English naturalist William J. Burchell is recorded as having been the first person to make a scientific collection of a *Clivia* (*C. nobilis*) in the wild, which he did near the mouth of the Great Fish River in the Eastern Cape in September 1815. During the early 1820s, the intrepid Kew gardener and botanical collector, James Bowie, gathered plants of this species, a pendulous-flowered clivia, in the same area of the Eastern Cape and sent them to England. In October 1828, Kew botanist and horticulturist John Lindley described *Clivia nobilis* and named it after Lady Charlotte Florentine Clive, Duchess of Northumberland. Lady Clive had been cultivating many of Bowie's plants in her conservatory at Syon House, just over the Thames from Kew. One of South Africa's showiest bulbous plants, the trumpet-flowered *Clivia miniata*, was discovered in KwaZulu-Natal in the early 1850s, and has been in cultivation in England for a century and a half. During the Victorian era it became a very popular indoor plant. In 1856, Major Robert Garden collected a different pendulous-flowered *Clivia* species in KwaZulu-Natal, which was sent to the Royal Botanic Gardens at Kew, and later described as *C. gardenii*. The discovery of the first yellow form of *Clivia miniata* in about 1888 in Zululand, KwaZulu-Natal, provided gardeners and breeders in



England with yet another sought-after floral prize from South Africa. The first published report of the yellow clivia was made by Mr W. Watson in volume 25 of *The Gardener's Chronicle* in 1899, which he followed with a formal description of *C. miniata* var. *citrina* in volume 56 of *The Garden*, published the same year. The most recently discovered species is the intriguing *C. caulescens*, another pendulous-flowered *Clivia* which develops a curious aerial stem with age, and occurs in the eastern parts of Mpumalanga and in the Northern Province. It was described by Dr R.A. Dyer in 1943.

Not surprisingly, *Clivia miniata* aroused the interest of horticulturists and breeders

almost immediately after its discovery, and many fabulous hybrids were subsequently raised in England, Belgium, Germany and other countries. During the late nineteenth and twentieth centuries, *Clivia* cultivation for indoor pot plants became the rage in the United Kingdom and Belgium, and although its popularity decreased in both countries in the early 1960s, a thriving *Clivia* industry still exists in Belgium today, producing many hundreds of thousands of flowering pot plants annually. Probably the most well known *Clivia* hybrid is *Clivia x cyrtanthiflora*, raised by Charles Raes in Ghent, Belgium in the late 1850s, and published by Van Houtte in 1869. It is reputed to be a hybrid between *C. miniata* and *C. nobilis*.

Early pioneers of *Clivia* cultivation and breeding in South Africa were undoubtedly the inimitable Gladys Blackbeard and the intrepid Gordon McNeil, both of whom belonged to that rare breed of person where individuality of spirit, and obsession with clivias and nature meant everything. Beginning in the late 1920s, Miss Gladys I. Blackbeard reared a fabulous collection of *Clivia* hybrids over a period of more than thirty years at Scott's Farm, Grahamstown

Above: The legendary *Clivia miniata* terraces of the late Gordon McNeil at Cyprus Farm near Ofcolaco, Northern Province

Right: *Clivia miniata* (variegated form) raised in Japan

Opposite: *Clivia miniata* (dark red form) from the Eastern Cape



in the Eastern Cape. Over a fifty-year period, Gordon McNeil amassed a vast collection of *Clivia* species and hybrids, as well as many other bulbous plants, at Cyprus Farm near Ofcolaco in the Northern Province, which he tended right up until his death in 1986. Gordon's *Clivia* breeding began in 1962 when he bought Gladys Blackbeard's collection which, according to Gordon's sister-in-law, Mrs Adelaide McNeil, 'required a whole railway truck to

his wife, Marguerite Rose McNeil, at Cyprus Farm.

In more recent times, the focus on *Clivia* breeding has shifted to the Far East, where a most impressive range of intraspecific hybrids (hybrids between different forms of *C. miniata*) as well as interspecific hybrids (hybrids between different *Clivia* species) have been raised. *Clivia miniata* is a very popular pot plant in China, Korea and Japan, and during a visit to Japan in 1991,



transport all the plants to the nearest railway station, and then to Cyprus Farm, where in ideal conditions they continue to thrive'. Gordon conducted countless hybridization experiments with his bulbs, including many intergeneric crosses; he was particularly proud of his putative hybrid between *Clivia miniata* and an unidentified *Hippeastrum* species, which he named 'Green Girl', of which the author was fortunate enough to receive a plant shortly before Gordon's passing. Since his death, his clivias continue to be tended by

the author was astonished to find a 120-page colour booklet in a local Kyushu supermarket covering every imaginable aspect of its cultivation and propagation! Masters of the art of plant selection, and seemingly obsessed with all plants exhibiting variegated foliage, the Japanese have produced a remarkable array of variegated forms of *C. miniata*, and numerous hybrids. Most famous among present-day *Clivia* breeders in that country is the affable and super-generous Mr Yoshikazu Nakamura, who holds the

world's most diverse collection of *Clivia* germ plasm at his *Clivia* Breeding Plantation south of Tokyo. Equally popular, if not more so, is the cultivation and breeding of *C. miniata* in the People's Republic of China, where dwarf, orange-flowered cultivars are widely grown as pot subjects. *Clivia miniata* is so popular in the city of Changchun, in north-eastern China, that its flower has become the city's emblem. During a recent visit to that country, the author was greatly surprised to see countless pots of flowering *Clivia miniata* surrounding the embalmed body of Mao Tse Tung inside the Chairman Mao Memorial Hall on Tiananmem Square, Beijing, which greatly relieved the otherwise sombre, austere surroundings. *Clivia miniata* became a popular container plant inside the palaces of the last imperial Chinese dynasty because of its symbolic longevity, with beautiful leaves further enhanced by flowers in season. In fact, the cultivation of clivias in the Far East is focused primarily on the beauty of the foliage – the dark green shiny leaves and variegated foliage that provide pleasure throughout the year – and not only its flower.

A tremendous international resurgence in the cultivation and breeding of *Clivia* has taken place over the past ten years. In South Africa this renewed interest resulted in the formation of the *Clivia* Club in 1992. It includes several regional branches within this country, and enjoys an impressive local and international membership.

Clivia caulescens (orange form)

Opposite above: *Clivia miniata* hybrid raised at Kirstenbosch





GENERAL INFORMATION

Taxonomy

The genus *Clivia* belongs to the family Amaryllidaceae, and consists of four species: *Clivia caulescens*, *C. gardenii*, *C. miniata* and *C. nobilis*. While there can be no mistaking the large, trumpet-shaped flowers of *C. miniata*, it is the three pendulous-flowered species which, at a glance, look very similar. These three species can usually be distinguished by a combination of the following features: flowering period, size of the seed, leaf texture, shape of the leaf apex, presence or absence of an elongated aerial stem, and degree of protrusion of stamens and stigma beyond the tips of the petals. However, it should be borne in mind that due to natural variation within each of these three species, the above-mentioned features are not always constant. The natural distribution of these three species can also be used as an additional aid to identification. (See pages 20-24 for individual species descriptions and page 23 for a condensed table of identification notes).

Growth cycle

All four *Clivia* species are evergreen and have perennial thick fleshy roots that are very well equipped for storing water and allow the plant a remarkable level of

drought resistance. The organ from which the roots and leaves grow is usually a vertical rhizomatous rootstock similar to that of *Agapanthus*. Clivias occur naturally in areas which normally receive summer rainfall, and minimal, if any, winter rainfall. Although evergreen, clivias naturally undergo a dormant period during the dry winter months when few, if any, new leaves are produced. With the onset of spring and summer rains, active growth begins and new leaves are produced at the apex of the growing shoot, while the oldest, outer leaves turn yellow, then brown, and finally fall off.

As a group, clivias have a long flowering period in the Southern Hemisphere, beginning in late winter or spring, extending throughout the summer months until late autumn. Viewed as separate species, it is safe to say that *C. gardenii* always flowers in autumn, *C. miniata* flowers from late winter until early summer, *C. caulescens* flowers mainly in spring and early summer, and *C. nobilis* flowers from late winter until midsummer. Generally speaking, sporadic flowers may appear on any of the four species at any time during the year. The *Clivia* fruit takes between six and twelve months to ripen, but will often remain on the plant well past maturity if left to its own devices. Eventually the outer fleshy layer disintegrates and releases the hard, pale brown or cream seeds, which often begin to germinate while inside the fruit wall.

Flowers

On the basis of flower form, *Clivia* can be divided into two groups of species, one having narrow, cylindrical flowers produced in a pendulous umbel, and the other having an umbel of trumpet-shaped flowers which radiate outwards in all



directions. The species which fall into the group with cylindrical, pendulous flowers are *C. caulescens*, *C. gardenii* and *C. nobilis*, and *C. miniata* is the only species in the trumpet-shaped group. The latter species exhibits a remarkable flower colour range in the wild, from cream to shades of pale yellow, through every imaginable shade of orange to bright red, and there are also several forms with pale peach-coloured flowers. Even within certain wild populations of this species occupying a relatively small surface area, a most astonishing level of variation exists. Clearly, such populations are evolving at a much faster rate than others. The flower colour of the species with cylindrical flowers is usually pale to dark orange or red, usually tipped with pale to dark green. They are probably pollinated by sunbirds in the wild, as the author has observed lesser doublecollared sunbirds (*Nectarinia*

chalybea) gathering nectar from all three species in the Kirstenbosch bulb nursery.

Many forms of *C. miniata* have a fairly strong scent reminiscent of azaleas. The stamens and stigma of the *C. miniata* flower are usually shorter than the length of the perianth lobes, while those of *C. caulescens* are as long as the perianth lobes, or protrude very slightly beyond them. In certain forms of *C. nobilis* the stigma and stamens protrude slightly and

the stigma protrudes up to 6 mm beyond the perianth lobes. *C. gardenii* has conspicuously exserted (protruding more than 7 mm beyond the perianth lobes) stigmas.

Fruits

After successful pollination of the flowers, fruits containing the developing seeds begin to form at the tips of the flower stalks (pedicels). The individual fruit containing

Opposite: *Clivia miniata* with unusual green markings

Ripe *Clivia miniata* berries



the seeds is known as a berry, and consists of an outer fleshy, pulpy layer which encloses the seeds within. The number of seeds within each berry varies and may contain from one to as many as twenty-five or even more seeds. In general, it is the berries of *C. miniata* that contain the most seeds. *C. gardenii* has the largest seeds (with a diameter of approximately 18mm), followed by *C. miniata* (15mm in diameter), *C. caulescens* (12mm in diameter), while *C. nobilis* has the smallest seeds (9mm in diameter). A ripening *Clivia* berry is normally green in colour, while those of many variegated clivias often also produce variegated berries. The berries of *C. miniata* and *C. gardenii* take from nine to

twelve months to mature, while those of *C. caulescens* and *C. nobilis* usually mature faster, from six to eight months. At maturity, the colour of the berry ranges from pale to dark red, orange-red, yellow, or a mixture of red, yellow and green, depending on the particular species or colour form. All forms of *C. miniata* which have flowers in shades of orange or red will produce orange-red or red berries, while most forms of this species with cream or yellow flowers will produce yellow berries (the berries of certain forms of yellow-flowered plants may be marked with dull reddish spots or may be a mixture of red, yellow and green). Forms of *C. miniata* with peach-coloured flowers produce either peachy-yellow or red fruits. True-breeding forms of *C. miniata* var. *citrina* produce yellow-flowered offspring when their flowers are cross-pollinated, but it is important to note that most forms of *C. miniata* var. *citrina* in cultivation today are not true-breeding. In other words, harvesting of seeds from yellow-flowered plants does not necessarily mean that the offspring from such seeds will all produce yellow flowers. It depends entirely on the genetic make-up of the yellow-flowered parent plant from which the seeds have been harvested, as well as that of the pollen parent with which the flowers have been pollinated, as to the number of yellow-flowered plants (if any) that will be produced.

Foliage

Leaf colour, shape, size and texture varies considerably among the different species in their natural habitat, as well as within different forms of the same species. There is variation from the dark green, arching, smooth strap-shaped leaves of *C. gardenii*, to the greyish, sub-erect, leathery, rough-





Opposite: *Clivia miniata* (variegated form raised in Japan) with ripening berries

Above: *Clivia miniata* dwarf hybrid raised at Kirstenbosch

Variation in *Clivia nobilis* leaf tip morphology



textured leaves of *C. nobilis*. Certain forms of *C. caulescens* have broad, pale green arching leaves with an abruptly tapering apex, while others have relatively narrow, dark green sub-erect leaves with a more acute apex. In most forms of *C. nobilis* the leaf tip is abruptly rounded, and notched to a greater or lesser degree. There is often considerable variation in the leaf tip shape on leaves of the same plant of this species. There is also some variation in the leaf margin characters. In *C. nobilis* the leaf margin is hard and minutely serrated, while the other three species have much softer margins which are never serrated. The greatest variation in leaf form is evident in *C. miniata*, but when one considers the wide natural distribution of this species, extending from the Eastern Cape through KwaZulu-Natal and Swaziland to Mpumalanga, this is hardly surprising.

In addition to variations within the leaves of naturally occurring clivias, a vast array of striking foliage types has arisen over the past century and a half in cultivation, as a result of intensive selection and hybridization. Consider the large, broad-leaved hybrids of *C. miniata* developed in Belgium in the late nineteenth and early twentieth centuries, and the more recent dwarf, broad-leaved hybrids raised in that country, as well as the countless dwarf, broad-leaved hybrids which have been raised in China and Japan. Spontaneous genetic mutation sometimes occurs in the leaves of clivias, resulting in the appearance of irregular longitudinal stripes or blotches, called variegation. The colour of these stripes and blotches ranges from pure white through many shades of cream, yellow and greenish-yellow, or a combination of these. Variegation in *Clivia* leaves, which occurs most frequently in *C. miniata*, is regarded as highly



Opposite: *Clivia miniata* (peach-coloured form) from the Eastern Cape

decorative and is sought after by certain members of the *Clivia*-growing community, especially in Japan. In fact, Japan's most famous contemporary *Clivia* breeder, Mr Yoshikazu Nakamura, concentrates on the production of clivias with variegated leaves in order to satisfy local demand, and even treats his plants with artificial irradiation to induce variegation patterns.

Distribution and habitat

The genus *Clivia* is endemic in southern Africa and its distribution extends from the coastal parts of the Eastern Cape in an easterly direction, through KwaZulu-Natal and Swaziland to Mpumalanga and into the Northern Province. Plants are often encountered growing in decaying leaf litter, but may also be found clinging to rocks in moss and lichen, or even within the forks of tree branches.

C. nobilis is found in the Eastern Cape and southern part of KwaZulu-Natal, where it occurs in evergreen forest as well as amongst dune vegetation. It may also occasionally be seen in quite sunny situations, and is the most sun tolerant of the four species.

C. miniata usually occurs in large colonies in dappled shade of evergreen forests, along shaded watercourses,

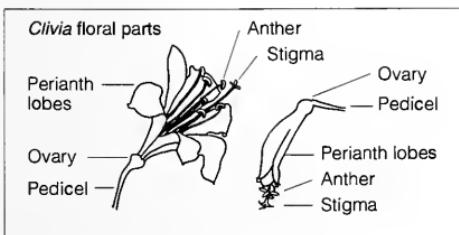
ledges and ravines, and occasionally on rocks or in tree forks. It is found in the Eastern Cape, KwaZulu-Natal, Swaziland and Mpumalanga.

C. gardenii grows in dappled shade of evergreen forest or within the shade of large rocks, and is also occasionally seen growing in the forks of trees. It occurs in the north-eastern part of the Eastern Cape and in KwaZulu-Natal.

C. caulescens is found in eastern Mpumalanga and in the Northern Province where it occurs on the forest floor and on margins of evergreen forests, on rocks, as well as on tree trunks and branches.

Conservation

Large numbers of all four *Clivia* species still exist in the wild today. However, it is a matter of grave concern that huge quantities of *C. miniata* have in recent times been removed from their natural habitat by unscrupulous collectors, a practise which is likely to increase with the recent upsurge in popularity of the genus. In addition, with the ever-increasing threat of 'development' taking place through parts of its natural distribution range, as well as the unsustainable harvesting of material for the muti trade, it is clear that the genus is in ever-increasing need of conservation. Wild populations of *C. nobilis* are particularly vulnerable to on-going building operations in parts of the sensitive coastal range of this species. The importance of conserving our wild *Clivia* resources cannot be emphasized strongly enough, as the loss of diversity could easily result in the collapse of the *Clivia* breeding industry due to the fickle whims of man. For example, the current popular trend towards the cultivation of variegated leaf forms as well as yellow-flowered forms of *C. miniata* could soon go out of fashion,



and if a serious loss of wild diversity did occur, the breeding of new and desirable material could be dealt a crushing blow.

Medicinal uses

Clivia miniata and *C. nobilis* have medicinal properties and the rhizome, leaves and roots are used by some of the indigenous peoples of South Africa. The rhizome, which is extremely toxic, is traditionally used by the Zulus to treat fever and snake-bite, and is also said to relieve pain.

Decoctions of the whole plant are also used to aid and hasten childbirth.



Clivia miniata

Right: *Clivia miniata* hybrid raised at Kirstenbosch

Opposite: *Clivia miniata* (pale peach form) from the Eastern Cape





CLIVIA SPECIES, VARIETIES AND CULTIVARS

There are four *Clivia* species, namely *C. miniata*, *C. caulescens*, *C. gardenii* and *C. nobilis*.

Clivia miniata

An extremely variable species consisting of two varieties – *C. miniata* var. *miniata* (orange and red forms) and *C. miniata* var. *citrina* (cream and yellow forms). This is the species most commonly grown in parks, gardens and conservatories and as an indoor plant, particularly the var. *miniata* (the orange or reddish-orange flowered forms). The cream and yellow-flowered forms, (var. *citrina*) are less frequently grown although their popularity has increased tremendously over the past ten years. Peach-coloured forms of this species are still very rare in cultivation.

Clivia miniata* var. *miniata

('miniata' refers to the reddish-orange colour of the flowers)

Common names Umayime (Zulu), bush lily; orange lily; boslelie.

Distribution Occurs in the Eastern Cape, KwaZulu-Natal, Swaziland and Mpumalanga.

Height 500 mm to 1 m.

Flowering period August to November (sporadically at any other time of year).

Brief identification notes An extremely variable plant with a large rounded umbel of many trumpet-shaped flowers in shades of orange, reddish-orange, red or pale peach-pink, usually with creamy-yellow or occasionally greenish throats. There is wide variation in width and length of the perianth lobes, which are recurved at their tips to varying degrees. There is also wide variation in the extent to which the stamens and stigma protrude or do not protrude beyond the tips of the flowers. The length, width, colour, shape, texture and position of the foliage varies enormously among different forms of this plant, from pale green, relatively narrow and soft, arching leaves to broad and relatively hard, dark green, sub-erect leaves. Certain forms of this plant form short, aerial leaf-bearing stems up to 100 mm long with advanced age. *C. miniata* usually occurs in large

colonies in evergreen forest, along shaded watercourses, ledges and ravines, and occasionally on rocks or in tree forks. In KwaZulu-Natal its distribution range overlaps that of *C. gardenii*, where these two species can sometimes be seen growing in close proximity.

Horticulturally speaking, *C. miniata* var. *miniata* is the most important of the four *Clivia* species. Its ease of cultivation, free-flowering nature and vast potential for breeding purposes has endeared it to gardeners, horticulturists and breeders throughout the world.

Clivia miniata* var. *citrina

('citrina' refers to the pale yellow flower colour)

Common names Yellow clivia, yellow bush lily.

Distribution Recorded from the Eastern Cape and KwaZulu-Natal.

Height 500 mm to 800 mm.

Flowering period August to November.

Brief identification notes An extremely variable plant with a large rounded umbel of many trumpet-shaped flowers in shades of cream or pale yellow, with darker yellow or occasionally greenish throats. There is wide variation in width and length of the perianth lobes which are recurved at their tips to varying degrees.

There is also wide variation in the extent to which the stamens and stigma protrude or do not protrude beyond the tips of the flowers. The length, width, colour and shape of the foliage varies



Clivia miniata hybrid raised at Wisley Gardens, England

Opposite above: *Clivia miniata* var. *citrina* 'Kirstenbosch Yellow'

Opposite below: *Clivia miniata* var. *citrina* 'Kirstenbosch Yellow'



considerably among different forms of this plant, from pale green, broad, relatively short leaves to dark green, relatively narrow long leaves. Certain forms of this plant, for example 'Kirstenbosch Yellow', form aerial, leaf bearing stems up to 200 mm long with age.

Since the discovery of the first plant of *Clivia miniata* var. *citrina* in Zululand, KwaZulu-Natal in about 1888, many other different forms of this plant have been found in various parts of KwaZulu-Natal and in the Eastern Cape. Some of these are true breeding strains while others are not. In addition, many more forms of *C. miniata* var.

citrina have arisen spontaneously in cultivation, and furthermore, many more man-made hybrids between different forms of the var. *citrina* have been raised in various parts of the world. Unfortunately, in many instances the exact origin and parentage of forms and hybrids of the var. *citrina* currently in cultivation is unknown.

The 'Kirstenbosch *Clivia* Collection' contains eight different forms of the var. *citrina*, three of which include:

***Clivia miniata* var. *citrina* 'Kirstenbosch Yellow'**

A large-flowered, slow-growing form with a strong fragrance reminiscent of azaleas. The flowers have well-reflexed petals and the plants have unusually broad, light green leaves. They were obtained in 1951 from the erstwhile Reed's Nursery in Wynberg, Cape Town. No further details of its origin are known. It is a true-breeding strain and has bright yellow fruits.

Height 350-650mm.

Flowering period Late August to early October.





***Clivia miniata* var. *citrina* 'Natal Yellow'**

A medium-flowered, vigorous form that reproduces rapidly by means of suckers produced at the tips of underground stolons. It is unscented, the flower buds and newly opened petals are tinged with green. The petals are slightly reflexed, and it has relatively narrow, dark green leaves. Plants were obtained from the late Cynthia Giddy in 1984 who originally collected it in the wild in KwaZulu-Natal. No further details of its origin are known. It is not a true-breeding plant and has bright yellow fruits with tiny red speckles.

Height 400-600 mm.

Flowering period Late September to late October.

***Clivia miniata* var. *citrina* 'Noyce's Sunburst'**

A large-flowered, broad-leaved, big plant with a strong fragrance reminiscent of azaleas. It is very similar to 'Kirstenbosch Yellow' differing in its much bigger size,

with the large, rounded inflorescence produced on a broad, robust peduncle carried well above the foliage. Plants were originally collected in Eshowe in KwaZulu-Natal, and distributed by the late Mr Michael Noyce of Hillcrest, KwaZulu-Natal. It is a true-breeding strain with bright yellow fruits.

Height 500-750 mm.

Flowering period Mid September to early October.

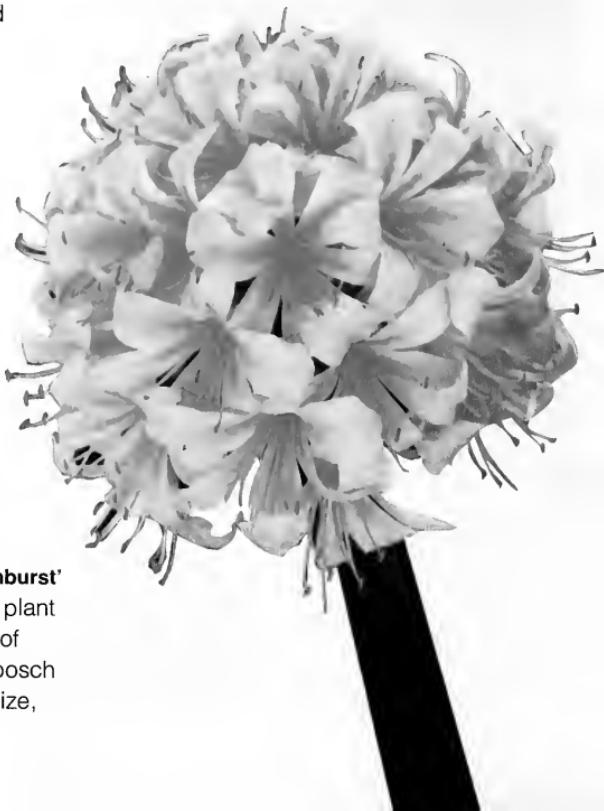
Clivia caulescens

('caulescens' refers to the distinct aerial stem seen in mature plants)

Common name Stem clivia.

Distribution Occurs in eastern Mpumalanga and in the Northern Province.

Height 500 mm to 1.5 m.





Flowering period Mainly September to October (sporadically at any other time of year).

Brief identification notes Flowers usually shorter (30-35 mm) than *C. gardenii* (41-52 mm) but within the same length

Clivia caulescens from Mpumalanga

Opposite above: *Clivia miniata* var. *citrina* 'Natal Yellow'

Opposite below: *Clivia miniata* var. *citrina* 'Noyce's Sunburst'

range of *C. nobilis* (24-40mm). There are usually more flowers per umbel (14-30) than *C. gardenii* (14-20) but fewer than *C. nobilis* (30 or more). Flower stalks (pedicels) are similar to *C. nobilis* in that they are slightly curved along their whole length, or distinctly curved at the tips and not stiff, erect or sub-erect as in *C. gardenii*. Leaves are arching, as in *C. gardenii*, not sub-erect and leathery with serrated margins and notched tips as in *C. nobilis*. They are almost always much broader (35-70mm) than *C. nobilis* (25-45mm) but usually within the width range of *C. gardenii* (35-60mm). Mature plants always form long, distinct, leaf-bearing aerial stems up to 1 m or more with age. *C. caulescens* occurs on the forest floor, on margins of evergreen forest, on large rocks in moss and lichen, as well as clinging to tree trunks and branches.



Clivia caulescens aerial stem

Above right: *Clivia nobilis* (red form) from the Eastern Cape, with ripe berries

Opposite: *Clivia gardenii* from KwaZulu-Natal



Clivia gardenii

('gardenii' commemorates Major Robert Garden)

Common name Major Garden's clivia.

Distribution Eastern Cape and KwaZulu-Natal.

Height 800mm to 1.3 m.

Flowering period April to June.

Brief identification notes Flowers usually larger and longer (41-52mm).but fewer (14-20) than *C. caulescens* (14-30) and *C. nobilis* (30 or more). Their shape is more curved and not as pendulous as the latter two species. Flower stalks are stiff during the flowering period, erect or sub-erect, bending downwards as the fruits mature. Stamens and stigma distinctly protrude beyond the flower tips. Leaves are arching, as in *C. caulescens*, are not sub-erect, are not leathery and do not have serrated

**Table of identification notes
for pendulous-flowered clivias**

	<i>C. nobilis</i>	<i>C. caulescens</i>	<i>C. gardenii</i>
Stigma protrudes more than 7 mm beyond flower tip			☒
Stigma does not protrude, or protrudes up to 6mm beyond flower tip	☒	☒	
Always flowers in autumn			☒
Flowers mainly in spring and summer	☒	☒	
Leaves leathery, sub-erect, margins usually serrated, tips usually notched	☒		
Leaves arching, not leathery, not serrated, tips not notched		☒	☒
Aerial stem never produced	☒		
Aerial stem always produced in mature specimens		☒	
Aerial stem very seldom produced (only in marshy conditions)			☒
Seed large (diameter approx. 18mm)			☒
Seed medium (diameter approx. 12mm)		☒	
Seed small (diameter approx. 9mm)	☒		

margins or notched tips as in *C. nobilis*. They are almost always broader (35-60mm) than *C. nobilis* (25-45mm) but within the width range of *C. caulescens* (35-70mm). Mature plants normally do not form distinct aerial, leaf-bearing stems except when forced to do so under marshy conditions. The distribution range of *C. gardenii* in KwaZulu-Natal overlaps that of *C. miniata*, where these two species can sometimes be seen growing in close proximity.

Clivia nobilis

('nobilis' refers to the noble Lady Clive)

Common names Boslelie, bush lily.

Distribution Eastern Cape and southern KwaZulu-Natal.

Height 500mm to 1.1m.

Flowering period July to December



(sporadically at any other time of year). Brief identification notes Flowers usually shorter (24-40mm) than *C. gardenii* (41-52mm) but within the same length range of *C. caulescens* (30-35mm). The umbel usually has more flowers (30 or more) than *C. gardenii* (14-20) and *C. caulescens* (14-30). The pendulous, cylindrical flowers vary in colour from very pale to dark orange or orange-red, with pale to dark green tips. There is also an unusual form with flowers that are very pale pinkish-yellow in the upper half and pale greenish-yellow in the lower half. Leaves are leathery, sub-erect, not arching as in *C. caulescens* and *C. gardenii*, minutely serrated along their margins, and the leaf tips are usually abruptly rounded and notched to a greater or lesser degree. Leaves are almost always much narrower (25-45mm) than *C. caulescens* (35-70mm) and *C. gardenii* (35-60mm). Mature plants never form distinct aerial leaf-bearing stems. *C. nobilis* occurs in evergreen forest, as well as amongst dune vegetation in relatively sunny conditions.

Clivia x cyrtanthiflora

Opposite: *Clivia miniata* hybrid raised at Cypress Farm near Ofcolaco, Northern Province





CLIVIA HYBRIDS

Many interspecific hybrids (hybrids between different *Clivia* species) as well as intraspecific hybrids (hybrids between different forms of the same *Clivia* species) have been raised in many parts of the world over the past century and a half. *Clivia x cyrtanthiflora* is an example of an interspecific hybrid, while *Clivia x kewensis* 'Bodnant Yellow' is an example of an intraspecific hybrid.

Clivia x cyrtanthiflora

('cyrtanthiflora' refers to the curved, pendulous flowers reminiscent of those of many *Cyrtanthus* species)

This is the most well known interspecific hybrid, and was raised by Charles Raes in Ghent, Belgium, in the late 1850s, and published by Van Houtte in 1869. It is reputed to be a hybrid between *C. nobilis* and *C. miniata*.

Height 500-700 mm.

Flowering period November to January (sporadically at any other time of year).

Brief identification notes In general the plant most closely resembles *C. nobilis* but has wider (up to 48mm) leathery sub-erect leaves which are usually not notched at their tips. The pendulous flowers are dark orange-red, similar to those of *C. nobilis*, but are longer and larger, flared towards the tips, with or without greenish tips, and the stigma and style protrudes well beyond



Lord Aberconway's estate at Bodnant, North Wales, and is reputed to be a hybrid between *C. miniata* var. *citrina* and a salmon-flowered form of *C. miniata*. It is characterized by a dense umbel of about 20 flowers, each flower being narrowly trumpet-shaped, about 75 mm long and about 75 mm wide, with somewhat recurved perianth lobes which are free almost to the base. Their colour is straw yellow, while the centre of the perianth lobes and the tube are shaded amber yellow.



the perianth lobes. Flower length varies from 35-43mm. Mature plants do not produce distinct aerial, leaf bearing stems.

Clivia x kewensis 'Bodnant Yellow' (illustrated in the *Journal of the Royal Horticultural Society* 83(6), figure 67 (1958).

('kewensis Bodnant Yellow' refers to plants raised at Kew and further bred at Bodnant Gardens in North Wales)

Height Probably between 500-800mm (not specifically recorded).

Flowering period Probably September-October (recorded as flowering in April in the United Kingdom).

Brief identification notes This yellow-flowered, intraspecific hybrid was exhibited by Lord Aberconway in April 1950 in which year it received an Award of Merit from the Royal Horticultural Society. It was raised on



Clivia miniata var. *citrina* hybrid
raised at Kirstenbosch

Opposite: *Clivia miniata* hybrid
raised at Kirstenbosch

Below: *Clivia miniata* dwarf
raised in Japan





Ripe *Clivia nobilis* berries

Below: *Clivia miniata* hybrid
raised at Kirstenbosch



CULTIVATION

Clivias are among the most easily cultivated bulbous plants. Their attractive evergreen leaves, brilliant flowerheads and eye-catching ripe berries, as well as their drought tolerance and ability to grow under low light conditions have endeared them to gardeners all over the world. Depending on climatic conditions, they make ideal garden or container plants, and *C. miniata* is also a useful cut flower.

Aspect and climate

Dappled shade is the most suitable location for growing clivias outdoors. They will also thrive in heavy shade, but under these conditions will flower very erratically, if at all. They can take a couple of hours of morning sun, but should have shade for the rest of the day. Excessive exposure to sun results in severe scorching of the leaves. They are excellent subjects for large containers on a shady patio, and can be grown very successfully indoors with good indirect sunlight. Although clivias are often encountered growing under humid conditions in their natural habitat, they thrive in areas with dry summers and cool wet winters, such as the Cape Peninsula.

Uses in the garden

While all four *Clivia* species are suitable for outdoor cultivation in mild climates, it is the



large-flowered *C. miniata* that is the most suitable and eye-catching species for mass garden cultivation. It is seen to best advantage planted in large drifts under evergreen trees. In the landscape they can easily be mixed with other indigenous shade-loving plants like *Asparagus densiflorus*, *Impatiens* and the very low-growing *Plectranthus* species. They are also most attractive when seen planted underneath shady tree ferns, and are so versatile that they are highly recommended for difficult dry, shaded parts of the garden. The three pendulous-flowered *Clivia* species are more suited to pockets in a shady rockery rather than to mass displays, as their flowers are not as eye-catching as those of *C. miniata*.

Once planted, clivias like to remain in the same position for many years, and best flowering results are always obtained from

well-established clumps. They resent root disturbance and can be left in the same position for up to ten years or more, and should only be divided once the clumps have become too thick and flowering performance diminishes.

Container subjects

Clivias, particularly *C. miniata* make outstanding container subjects. They enjoy having their roots slightly restricted, and provided they are well fertilized, flower extremely well in large terracotta or plastic pots, or large wine barrels. In addition, their attractive evergreen leaves and brightly coloured ripe berries provide interest throughout the year. *C. miniata* is particularly decorative when grown in large terracotta pots flanking shady garden stairs or on either side of a shady front door. Once established, containerized clivias

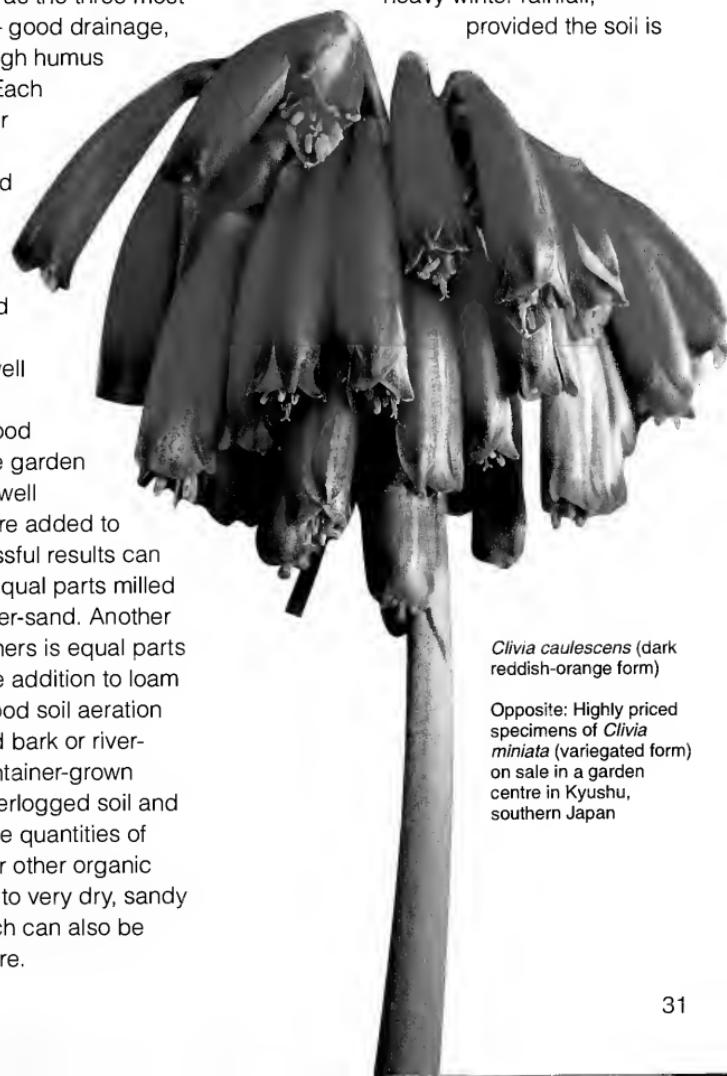
can be left undisturbed for many years, until flowering performance diminishes. It is essential to provide good drainage for containerized clivias as the roots will soon rot under soggy, poorly aerated conditions. There must be sufficient drainage holes at the bottom of the container, and a thick layer of broken crocks or stone chips should be placed over these.

Growing medium

Clivias can be grown successfully in a wide variety of media, as long as the three most important requirements – good drainage, good soil aeration and high humus content – are provided. Each clivia grower will discover his/her own preferred medium, and no hard and fast rules can be laid down in this regard. At Kirstenbosch Botanical Garden the medium used for containerized plants consists of equal parts well decomposed compost, coarse river-sand and good garden loam, while in the garden itself, large quantities of well decomposed compost are added to the garden loam. Successful results can also be obtained using equal parts milled pine bark and coarse river-sand. Another good medium for containers is equal parts peat and leaf-mould. The addition to loam of material that allows good soil aeration (such as compost, milled bark or river-sand) is essential for container-grown plants as it prevents waterlogged soil and subsequent rotting. Large quantities of decomposed compost or other organic matter should be added to very dry, sandy soils, and a layer of mulch can also be used to conserve moisture.

Watering

Once established, clivia plants are remarkably drought resistant in all but the driest of conditions, provided they have sufficient shade and plenty of organic matter within the growing medium. Ideally, they should receive regular watering during their active growing period during the summer months, and less water during winter. They easily survive long periods of drought during the winter, but being such versatile plants, can also easily withstand heavy winter rainfall, provided the soil is



Clivia caulescens (dark reddish-orange form)

Opposite: Highly priced specimens of *Clivia miniata* (variegated form) on sale in a garden centre in Kyushu, southern Japan

well drained (such as is experienced in the southern suburbs of the Cape Peninsula). A suggested watering programme for both containerized and garden clivias is one good watering per week during the summer months, and one good watering every two to three weeks during winter.

Feeding

Clivias are gross feeders, and the quantity and quality of flowers, leaves and fruits can be greatly enhanced by regular feeding via both the foliage and roots. Young seedlings respond very well to liquid feeds of seaweed extract like Seagro and Kelpak, as well as to Supranure, which contains a growth stimulant, applied every three or four weeks, either as a foliar spray or as a soil drench. For mature plants in the garden or in containers, applications of a granular fertilizer such as 3:1:5 is recommended three times during the summer growing season, ie in early spring, early summer and late summer. Additional trace nutrient element fertilizer like Trellmix is also recommended if plants show deficiency. Slow-release fertilizers like Osmocote can also be used to fertilize the soil over a long period.

Hardiness

All four *Clivia* species are frost tender, and are best grown in large tubs or pots in the cool glasshouse or inside the home in very cold climates. *Clivia miniata* became a very popular indoor plant during the Victorian era because of its tolerance of low light intensity and dry atmosphere. When grown in low light conditions, it is unlikely to produce flowers, yet the foliage remains pleasing.



Right: Young *Clivia miniata* seedlings

Below: *Clivia miniata* thrives in dappled shade



PROPAGATION

Propagation by seed and by division of thick clumps are currently the most widely used methods of increasing stocks of *Clivia* plants. Tissue culture is a new method currently being developed for propagating *Clivia* stocks, but much research has still to be done in order to make this method commercially viable.

Seed

Propagation of clivias by means of seed is an easy, inexpensive way of increasing stocks. The seeds are harvested once the ripe berries have turned bright orange-red or yellow. Break open the outer fleshy layer of each berry, remove the seeds and clean them by placing in a bowl of water. The seeds are best sown in deep seed trays in a medium of equal parts coarse river-sand and finely milled bark. Press each seed into the medium so that only half the seed rests below the surface, and allow about 20mm between each seed to allow adequate growth space for each seedling. Place the seed trays in a shaded position and keep moist by watering once or twice per week with a fine rose.

Germination takes place in four to six weeks with the appearance of a radicle from each seed, followed by the first cotyledon (seed leaf). Once germinated, seedlings of *C. miniata*, *C. gardenii* and *C. caulescens* usually grow rapidly, but



those of *C. nobilis* are generally much slower. Seedlings can be allowed to remain in the seedtrays for two years, and at the beginning of the third year can be planted out into the garden or into permanent pots. Alternatively, seedlings can be 'potted up' into nursery bags after one year and allowed to 'grow on' for a further year before planting out.

Certain dwarf *C. miniata* hybrids currently being produced commercially in Belgium can be induced to flower in as little as two years from seed, or after twelve or thirteen leaves have formed (Van Huylenbroeck, 1999). However, seedlings of *C. miniata* generally take three or four

years to flower for the first time from seed, as do *C. caulescens* and *C. gardenii*. On the other hand, seedlings of *C. nobilis* are generally rather slow-growing, and may take up to five years to flower. When propagating *C. miniata* var. *citrina* from seed, it is important to note that seedlings produced from seed harvested from yellow-flowered parents will not necessarily all yield yellow-flowered plants, unless the parent plants are a true-breeding strain. It is possible to determine at an early stage whether seedlings of *C. miniata* var. *citrina* will produce yellow flowers by examining the base of the first leaves produced by the seedling at any stage during the first or

second year of growth. If the colour of the base of the leaves is plain green, the plant will produce yellow flowers, but if the base of the leaves is dark reddish-maroon, the flowers will be orange.

There are several methods of pollinating *Clivia* flowers, and each grower will discover his/her own most convenient method. One method is to collect pollen by dabbing the base of a small water-paint brush over the anthers and then similarly dabbing the brush over a stigma.

Alternatively one can slightly dampen the base of an earbud and transfer pollen in the same manner. Another method is to use one's fingers by lightly pinching an anther between the thumb and index finger until the pollen adheres, and then lightly pinching the stigma until the pollen adheres. Be sure to use different brushes and earbuds when pollinating different plants, or wash your hands if using your fingers. If one is wanting to produce a particular hybrid, the anthers of the female (pod) parent should be removed in order to prevent open pollination. Keep a written record of all hybrids made.



Division

Division of clivias by separation of offset plants is currently the most reliable method of propagating plants which are exactly true to type. The best time to divide clivias is in early summer, immediately after the flowering period. The autumn flowering *C. gardenii* can also be divided at this time. All faded flowerheads should be cut off to prevent formation of seeds. Large clumps



Opposite: Ripe *Clivia miniata* berry containing seeds

Above: *Clivia miniata* seedlings illustrating basal leaf pigmentation: at left, green basal leaf pigmentation indicating a plant which will produce yellow flowers; at right, purplish-maroon basal leaf pigmentation indicating a plant that will produce orange or red flowers

Tray of two-year-old *Clivia miniata* seedlings ready for planting out

can be dug up and prized apart by placing two forks back to back in the centre, or a sharp spade can be used to cut off individual plants. Be sure to retain as much root growth as possible, and remove some of the outer leaves to reduce water loss. Ideally the separated offsets should be replanted as soon as possible in damp,

well composted soil and kept well shaded. Newly divided clivias will sometimes not flower for a year or two, until they have become well established. While most forms of *C. miniata* and certain forms of *C. nobilis* reproduce rapidly by offsets, *C. caulescens* and *C. gardenii* are much slower to reproduce by this method.



Right: Lily borer (amaryllis caterpillar) devastates *Clivia* plants

Below: *Clivia miniata* (dark red form) from the Eastern Cape



PESTS AND DISEASES

Clivias are subject to a fairly wide range of pests and diseases, and the following measures are suggested for their control.

Pests

Lily borer (also known as amaryllis caterpillar) This is without doubt the most important pest known to most *Clivia* growers in southern Africa. The night-flying moth usually lays its eggs on the undersides of the *Clivia* leaf. The tough leathery leaves of *C. nobilis* are attacked to a far lesser extent than the other three species, which have relatively soft, easily penetrable leaves. After hatching, the young caterpillars rapidly bore into the leaf tissue, which they proceed to consume in vast quantities while moving towards the base of the leaf. If left unchecked, the caterpillars proceed towards the leaf bases, eventually destroying the growing shoot and even causing the death of the plant. Large caterpillars can be picked off by hand or affected leaves can be cut off, stamped on and placed in the compost heap. This method of control has limited success as inevitably some caterpillars escape one's attention. A much more effective method of control is to spray or dust affected plants with a carbaryl-based insecticide such as Carbaryl, Karbaspray or Karbadust, which are partially environmentally compatible.



Far left: Sun scorch on foliage of *Clivia miniata*

Left: Snout beetle damage on *Clivia miniata* foliage

Opposite: Snout beetle damage on *Clivia miniata* flowers

Snout beetle These very destructive small grey or pale brown beetles are nocturnal and feed on *Clivia* flowers as well as leaf blades and margins, leaving behind characteristic bite marks. During the day the beetles hide among dry leaves near the base of the plant, at the bases of the leaves or inside the flowers. They can be picked off by hand at night with a bright torch, but the slightest movement causes the beetles to drop to the ground where they are completely camouflaged; it is best to place a cupped hand or container underneath the plant and shake the culprits off. Alternately, one can spray with a cypermethrin-based insecticide such as Ripcord, which is partially environmentally compatible, as a full cover spray.

Slugs and snails These can do great damage to *Clivia* flowers, developing flower buds, and flower stems, and to a lesser extent, leaves. They are also transmitters of viral diseases, to which

clivias are susceptible. Pick off the culprits by hand, or, in severe infestations, keep ducks to do the job for you. (Muscovies or Dutch quackers are ideal). Alternatively, one can place broken eggshells or tobacco dust around the base of the plants.

Mealy bug These white, waxy sucking insects often attack the bases of the leaves, causing malformed foliage, and can also transmit viral diseases. They are spread from one plant to another by ants. Spray with partially environmentally compatible chlorpyrifos (eg Chlorpirifos) as a full cover spray, or as a soil drench for container grown plants. Ants can be controlled in an environmentally friendly way by pouring neat Jeyes Fluid down ant holes, and then washing it down with water. The process should be repeated frequently.

Thrips These minute, elongated brown insects feed on the undersides of the *Clivia*

leaf, leaving behind characteristic white streaks. They are usually prevalent during the hot summer months in the Southern Hemisphere. Spray with partially environmentally compatible mercaptothion (eg Malasol) or chlorpyrifos (eg Chlorpirifos) as a full cover spray, ensuring that the spray reaches the undersides of the leaves.

Gall midge fly The small yellowish larvae of this fly occasionally burrow into young *Clivia* flower buds, causing malformation, and are also responsible for secondary bacterial infection. Preventative spraying is necessary, as soon as buds begin to appear. Spray with partially environmentally compatible fenthion (eg Lebaycid) as a full cover spray.

Mole rats In some parts of South Africa such as in KwaZulu-Natal, mole rats can be troublesome in that they consume the fleshy roots and rhizome of the *Clivia* plant, often resulting in death of the plant.

A temporary measure of control can be achieved in susceptible areas by planting clivias into strong, sunken wire baskets, and by placing rocks around each plant.

Diseases

Agapanthus fungus The *Agapanthus* fungus *Macrophoma agapanthi* also attacks *Clivia* foliage, causing the leaves to turn brown and die back from the tips.

Spraying is not recommended unless infestation is severe, in which case spray with environmentally compatible mancozeb (eg Dithane M45) or captab (eg Orthocide) as a full cover spray.

Soft crown rot This devastating disease is probably caused by a bacteria which attacks the leaf bases and rhizome, causing the whole plant to disintegrate and collapse. Previously healthy plants suddenly begin wilting and fall over. These symptoms are usually caused by poorly

drained soil, which becomes over-saturated as a result of excessive rainfall. The disease rapidly spreads to neighbouring plants. Badly affected plants must be destroyed. Plants can often be saved if symptoms are noticed early enough, and if the rhizome has not been too badly affected. Remove the rotting portions by brushing with an old scrubbing brush, and washing the affected area of the plant thoroughly with water. Apply a good coating of captab (eg Kaptan), or soak the affected parts in Dithane M45 for



half an hour, allowing to dry for 20 minutes and replanting in slightly damp, pure river-sand. New roots will form within a month, and plants should be allowed to fully recover in this medium for about six months, before being planted out into the garden or into permanent pots.

Leaf spots The foliage of *C. miniata* is subject to several fungal diseases which result in the formation of unsightly spots or blotches. Unfortunately very little is known

about these diseases at present. The best course of action is to cut off and destroy affected portions of leaves as soon as large spots or blotches are noticed, and to treat affected plants with a systemic fungicide containing benomyl (eg Benlate), as a soil drench.

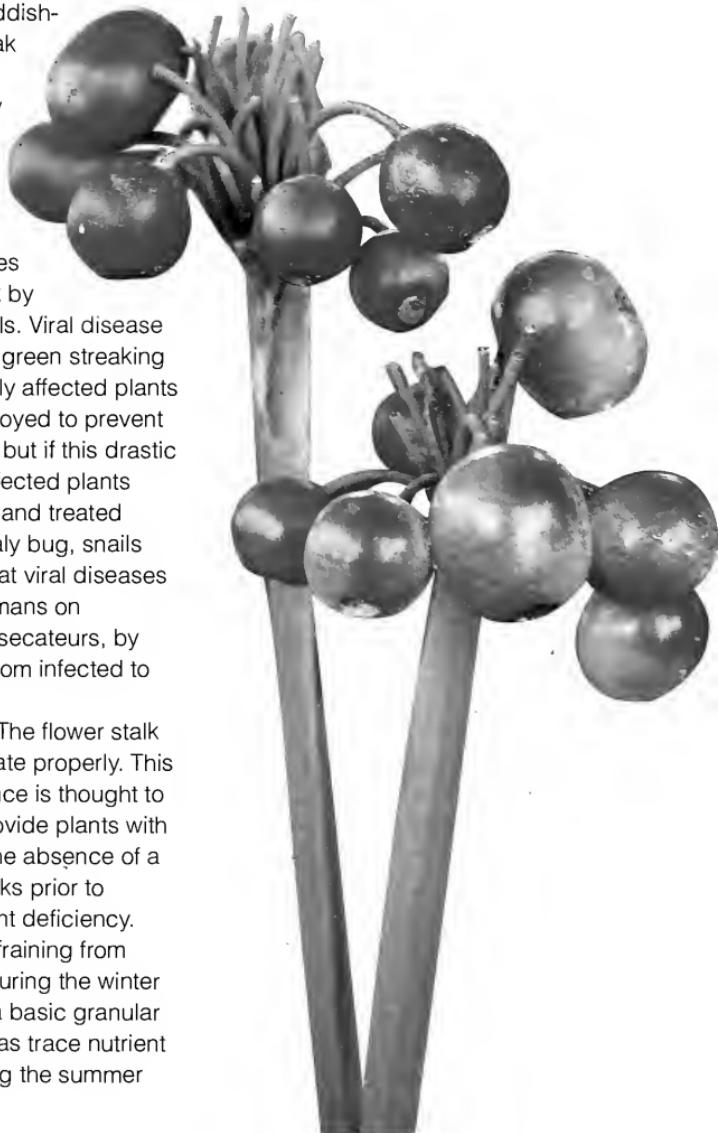
Rust Rust fungi regularly attack the foliage of *C. miniata*, visible as reddish-brown pustules which break open and shed spores. Spray with environmentally compatible mancozeb (eg Dithane M45) as a full cover spray.

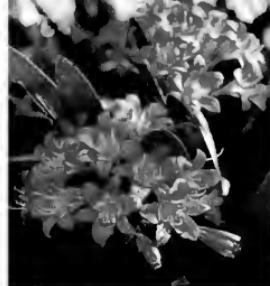
Viral diseases *Clivias* are susceptible to viral diseases mainly as a result of attack by mealy bug, slugs and snails. Viral disease is visible as dark and light green streaking across the leaf blade. Badly affected plants should preferably be destroyed to prevent infection of healthy plants, but if this drastic measure is not desired, affected plants must be kept well isolated and treated preventatively against mealy bug, snails and slugs. Bear in mind that viral diseases can also be spread by humans on gardening equipment like secateurs, by transferring infected sap from infected to healthy plants.

Flower stalk malformation The flower stalk of *C. miniata* fails to elongate properly. This somewhat erratic occurrence is thought to be caused by failure to provide plants with a winter rest period, and the absence of a cold period of several weeks prior to flowering, and/or by nutrient deficiency. Treat affected plants by refraining from feeding or over-watering during the winter months, and by applying a basic granular fertilizer like 3:1:5, as well as trace nutrient elements like Treemix during the summer growing period.

Opposite: *Clivia miniata* (pale orange form)

Ripe *Clivia caulescens* berries





CLIVIA CLUB ADDRESSES

Membership of the Clivia Club will keep you in touch with other *Clivia* enthusiasts, whether they be keen amateurs, specialist collectors or professional researchers. The Club publishes a quarterly newsletter, holds meetings, arranges flower shows and supplies seeds and plants.

Those wishing to join the Clivia Club and who reside in South Africa are encouraged to contact their local Clivia Club Branch in either the Northern Branch, the KwaZulu-Natal Branch or the Cape Province Branch. Those residing in provinces without a local branch should contact the Head Office. Those residing in Australia should contact the Australian Branch, while those residing in all other countries should contact the Head Office, South Africa.

South Africa

The Secretary
Clivia Club (Head Office)
P.O. Box 74868
Lynnwood Ridge
0040



The Chairman
Clivia Club (Northern Branch)
P.O. Box 99583
Garsfontein
0042
Tel +27 012 998 5942
E-mail vlokac@alpha.unisa.ac.za

The Chairman
Clivia Club (KwaZulu-Natal Branch)
P.O. Box 74
Eston
3740
Tel/Fax +27 031 258 1978

The Chairman
Clivia Club (Cape Province Branch)
Kirstenbosch Gardens
Private Bag X7
Claremont
7735
Tel +27 021 762 1166
Fax +27 021 797 0002
E-mail woodward@nbict.nbi.ac.za

Australia

The Chairman
Clivia Club (Australian Branch)
593 Hawkesbury Road
Winmalee
New South Wales 2777
Tel +61 4754 3287
E-mail cliviasmith@hotmail.com

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THE CLIVIA CLUB

Regular, informal and friendly meetings are held throughout the year to share knowledge, experience and clivia-related information.

Members benefit in the following ways:

- quarterly newsletter
- yearbook
- regular meetings
- annual show
- seed & plant sales
- distribution & exchange

TELEPHONE CONTACTS

International

Mick Dower

+27 (0) 21 61 7832 Fax +27 (0) 21 674 0475

Northern Branch (Gauteng)

Chris Vlok

+27 (0) 12 998 5942

Sarel Naude

+27 (0) 12 661 5491

Cape Branch

Toy Jennings

+27 (0) 21 762 7043

Joy Woodward

+27 (0) 21 762 1166

KwaZulu- Natal Branch

Sean Chubb

+27 (0) 325 81978

Val Thurston

+27 (0) 329 431316



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Jim Holmes in the yellow *Clivia* greenhouse

Cape Seed and Bulb supplies plants and seeds of its yellow and pastel colour *Clivia* worldwide to both nurseries and private enthusiasts. Every September when the plants are in full bloom the *Clivia* greenhouse is open to the public.

If you are interested in clivias, pictures of our hybrids can be viewed on the internet via our website. Seeds can be ordered online and there is also a section with answers to frequently asked questions.

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Phone: +27 21 887 9418
Fax: +27 21 887 0823
e-mail: capeseed@iafrica.com

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Cover picture: *Clivia miniata* hybrid

Inset: Ripe berries of *Clivia miniata*
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